

ELECTROSTATIC VALVES FOR MICROFLUIDIC DEVICES

I ABSTRACT OF THE DISCLOSURE

Valve structures formed in elastomer material are electrostatically actuated
5 by applying voltage to a flexible, electrically conductive wire pattern. An actuation force
generated between the patterned wire structure and an electrode result in closure of a flow
channel formed in elastomer material underlying the wire. In one embodiment of a valve
structure in accordance with the present invention, the wire structure is patterned by
lithography and etching of a copper/polyimide laminate, with an underlying gold plate
10 positioned on the opposite side of the flow channel serving as an electrode. In an
alternative embodiment, a first wire structure is patterned by physically cutting out a first
pattern of strips from an Aluminum/MYLAR(R) laminate sheet. A second patterned wire
structure serving as the electrode is formed by the same method, and positioned on the
opposite side of a control channel. Application of an actuation force between the first and
15 second patterned strips closes the control channel and an associated flow channel
underlying the control channel.